

What is claimed is:

1. A process for the production of an anhydrosugar alcohol, without using organic solvents, the process comprising:

- heating a selected sugar alcohol or monoanhydrosugar alcohol starting material, with stirring, until molten;
- dehydrating the starting material, under vacuum and while maintaining heat and stirring, in the presence of an acid catalyst to produce a dehydrated anhydrosugar alcohol mixture; and
- purifying the anhydrosugar alcohol.

2. The process of Claim 1 wherein the acid catalyst is a soluble acid.

3. The process of Claim 2 wherein the acid catalyst is selected from the group consisting of sulfuric acid, phosphoric acid, p-toluenesulfonic acid, and p-methanesulfonic acid.

4. The process of Claim 1 wherein the acid catalyst is a zeolyte powder.

5. The process of Claim 4 wherein the zeolyte powder is selected from the group consisting of CBV 3024, 5534G, T-2665, and T-4480.

6. The process of Claim 1 wherein the acid catalyst is an acidic ion exchange resin.

7. The process of Claim 6 wherein the acidic ion exchange resin is selected from the group consisting of AG50W-X12, Amberlyst 35, Amberlyst 15, RCP21H, and Dowex 50Wx4.

- centrifuging the crystallized anhydrosugar alcohol product to produce a very pure anhydrosugar alcohol.

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24. The process of Claim 13 wherein the dehydration is performed at a vacuum pressure of from about 0.1 Torr to about 10 Torr.
25. The process of Claim 13 wherein the dehydration is performed at a vacuum pressure of from about 1 Torr to about 10 Torr.
26. The process of ~~Claim 13~~ wherein the vacuum distillation is performed at a vapor temperature of from about 155°C to about 170°C and a pot temperature of at least the distilling point of the dehydrated anhydrosugar alcohol.
27. The process of Claim 13 wherein the vacuum distillation is performed at a vapor temperature of from about 160°C to about 170°C and a pot temperature of at least the distilling point of the dehydrated anhydrosugar alcohol.
28. The process of Claim 13 wherein the vacuum distillation is performed at a vapor temperature of from about 165°C to about 170°C and a pot temperature of at least the distillation point of the dehydrated anhydrosugar alcohol.
29. The process of Claim 13 wherein the vacuum distillation is performed at a vapor temperature of 170°C and a pot temperature of at least the distillation point of the dehydrated anhydrosugar alcohol.
30. The process of Claim 13 wherein the vacuum distillation is performed at a vacuum pressure of from about .01 Torr to about 40 Torr.
31. The process of Claim 13 wherein the vacuum distillation is performed at a vacuum pressure of from about 0.1 Torr to about 10 Torr.
32. The process of ~~Claim 13~~ wherein the vacuum distillation is performed at a vacuum pressure of from about 1 Torr to about 10 Torr.

33. A process for the production of purified isosorbide, without the use of organic solvents, the process comprising:

- heating sorbitol powder at a temperature of from about 98°C to about 105°C, with stirring, until molten;
- dehydrating the melted sorbitol by catalysis with an acidic ion exchange resin, added in an amount giving from about 0.01 to about .15 equivalents, under vacuum pressure of from about 1 Torr to about 10 Torr, and while maintaining stirring and temperature, to form an isosorbide mixture;
- vacuum distilling the dehydrated isosorbide at a pot temperature of approximately 180°C and a vapor temperature of approximately 170°C, and a vacuum pressure of from about 1 Torr to about 10 Torr, to form an isosorbide distillate;
- melt crystallizing the isosorbide distillate by heating the distillate to at least approximately 65°C and then cooling the distillate, over from about 30 minutes to about 45 minutes, to a temperature of about 25°C to about 35°C to form a slurry-like isosorbide solution;
- centrifuging the isosorbide solution and;
- collecting the purified isosorbide.

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